

Agilent U1401A Handheld Multi-Function Calibrator/Meter

Quick Start Guide



The following items are included with your instrument:

- ✓ Carrying case and protective holster
- ✓ Eight rechargeable 1.2 V Ni-MH AA batteries
- ✓ Power cord and external AC power adapter
- ✓ Standard test lead kit
- ✓ Yellow test lead for mA simulation
- ✓ Printed Quick Start Guide
- ✓ CD containing the User's and Service Guide and application software
- ✓ Certificate of Calibration

If anything is missing or damaged, please contact the nearest Agilent Sales Office.

WARNING

Ensure that the terminal connections are correct for that particular measurement selection before starting any measurement. To avoid damage to the device, do not exceed the rated input limit.

CAUTION

Degradation of some product specifications can occur in the presence of ambient electromagnetic (EM) fields and noise that are coupled to the powerline or I/O cables of the instrument. The instrument will self-recover and operate to all specifications when the source of ambient EM field and noise are removed or when the instrument is protected from the ambient EM field or when the instrument cabling is shielded from the ambient EM noise.

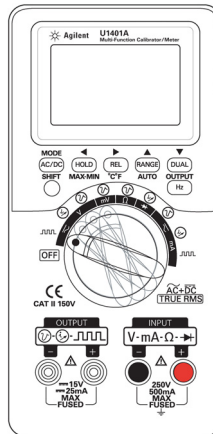


Agilent Technologies

Performing Voltage Measurements

Measuring AC voltage

- 1 Set the rotary switch to $\sim V$ or **mV**. Press **(AC/DC)** to select **AC**.
- 2 Connect the red (+) and black (-) test leads to the **INPUT** terminals.
- 3 Probe the test points and read the display.
- 4 Press **(DUAL)** to display dual measurements.



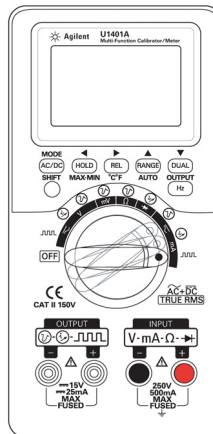
Measuring DC voltage

- 1 Set the rotary switch to $\sim V$ or **mV**. Press **(AC/DC)** to select **DC**.
- 2 Connect the red (+) and black (-) test leads to the **INPUT** terminals.
- 3 Probe the test points and read the display.
- 4 Press **(DUAL)** to display dual measurements.

Performing Current Measurements

Measuring AC current

- 1 Set the rotary switch to $\sim mA$. Press **(AC/DC)** to select **AC**.
- 2 Connect the red (+) and black (-) test leads to the **INPUT** terminals.
- 3 Probe the test points in series with the circuit and read the display.



Measuring DC current

- 1 Set the rotary switch to $\sim mA$. Press **(AC/DC)** to select **DC**.
- 2 Connect the red (+) and black (-) test leads to the **INPUT** terminals.
- 3 Probe the test points in series with the circuit and read the display.

Percentage scale of DC mA measurement

With the rotary switch at $\sim mA$, another option selectable with the **(AC/DC)** key is the percentage scale of DC mA measurement.

Frequency measurement

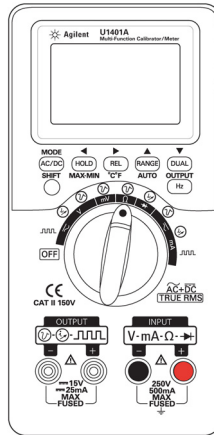
During AC/DC voltage or AC/DC current measurement, you can measure the signal frequency by pressing **(Hz)** at any time.

Performing Resistance Measurement and Continuity Test

CAUTION

Disconnect circuit power and discharge all high-voltage capacitors before measuring resistance to prevent possible damage to the instrument or the device under test.

- 1 Set the rotary switch to Ω .
- 2 Connect the red (+) and black (–) test leads to the **INPUT** terminals.
- 3 Probe the resistor (or shunt) leads and read the display.
- 4 To perform continuity test, press **AC/DC** to toggle the audible continuity function *on* or *off*.



For continuity test, the instrument will beep if the resistance is less than the values indicated below:

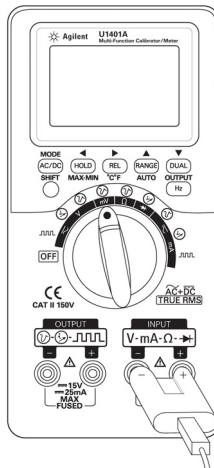
Measurement range	Resistance threshold
500.00 Ω	10 Ω
5.0000 k Ω	100 Ω
50.000 k Ω	1 k Ω
500.00 k Ω	10 k Ω
5.0000 M Ω	100 k Ω
50.000 M Ω	1 M Ω

Performing Temperature Measurements

WARNING

- Before measuring the temperature of a circuit or device, disconnect its power.
- The bead type thermocouple probe is suitable for measuring temperature from -40°C to 204°C in Teflon compatible environments. The probes may emit toxic gas above this temperature range.

- 1 Set the slide switch to the **M** position to disable the output.
- 2 Set the rotary switch to **mV**.
- 3 Press and hold **REL** for more than 1 second.
- 4 Plug the thermocouple probe (with adapter) into the **INPUT** terminals.
- 5 Touch the surface to be measured with the thermocouple probe and read the display.



Best practices:




- Do not bend the thermocouple leads at sharp angles. Repeated bending may break the leads.
- Do not immerse the thermocouple probe in any liquid.
- Clean the surface to be measured and make sure that the probe is securely touching the surface.

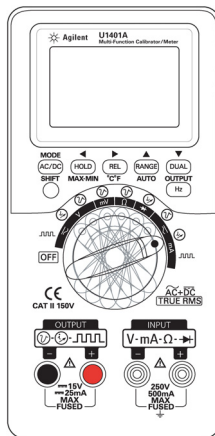
NOTE

The U1401A can generate and measure signals simultaneously. While the **(SHIFT)** mode is enabled, pressing **OUTPUT** disables the U1401A output by placing it in the standby mode (**(SBY)**). Pressing **OUTPUT** again toggles the output on (**(OUT)**).



Constant Voltage and Current Outputs

Constant voltage output

- 1 Set the rotary switch to any one of the  positions.
- 2 Press **SHIFT**. The **(SHIFT)** annunciator appears.
- 3 Press **MODE** to cycle through ± 1.5 V, ± 15 V, **(SCAN)** ± 1.5 V, **(SCAN)** ± 15 V,  ± 1.5 V, and  ± 15 V output modes.
- 4 Select ± 1.5 V or ± 15 V.
- 5 Press **OUTPUT** to output the signal.




Constant current output

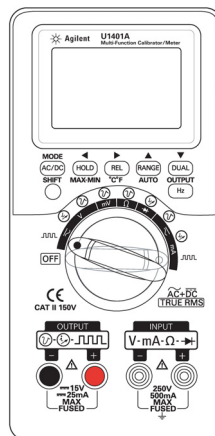
- 1 Set the rotary switch to any one of the  positions.
- 2 Press **SHIFT**. The **(SHIFT)** annunciator appears.
- 3 Press **MODE** to cycle through ± 25 mA, **(SCAN)** ± 25 mA, and  ± 25 mA output modes.
- 4 Select ± 25 mA.
- 5 Press **OUTPUT** to output the signal.

Autoscan and autoramp outputs

The voltage and current outputs can also be generated in predefined steps or ramp. Refer to the User's and Service Guide for the detailed procedures.

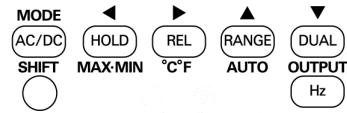
Square Wave Output

- 1 Set the rotary switch to .
- 2 Press **SHIFT**. The **(SHIFT)** annunciator appears.
- 3 Press **MODE** to cycle through the adjustment modes for frequency (**(Hz)**), duty cycle (**(%)**), pulse width (**(ms)**), and amplitude (**(Level)**). Select a parameter to adjust.



- 4 Press **▲** or **▼** to adjust the parameter value.
- 5 Press **OUTPUT** to output the square wave signal.

Other Functions and Features

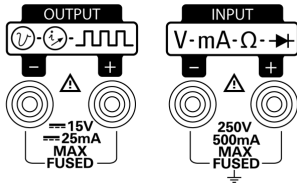


Action	Procedure
Selects AC, DC, or AC+DC measurement	Press (AC/DC)
Toggles peak hold mode on and off	Press and hold (AC/DC) for > 1 s
Freezes the measured value	With data hold mode enabled, press (HOLD) . Press and hold (HOLD) for > 1 s to exit.
Enters or exits the refresh hold mode	With refresh hold mode enabled, press (HOLD)
Enters or exits the dynamic recording mode	Press and hold (HOLD) for > 1 s
Offsets the measured value	Press (REL)
Selects the measurement range	Press (RANGE)
Turns on autorange	Press and hold (RANGE) for > 1 s
Turns on dual display	Press (DUAL)
Turns on the frequency measurement function	Press (Hz)
Enables the shifted functions of the keypad	Press SHIFT
Toggles the backlight on or off	Press and hold SHIFT for > 1 s
Selects output mode and range for voltage and current output	With rotary switch at or , and with (SHIFT) mode enabled, press MODE
Selects parameter adjustments for square wave output	With rotary switch at , and with (SHIFT) mode enabled, press MODE
Selects a digit or the polarity to be adjusted	With (SHIFT) mode enabled, press ◀ or ▶
Adjusts a digit or the polarity	With (SHIFT) mode enabled, press ▲ or ▼
Toggles the output state on and off	With (SHIFT) mode enabled, press OUTPUT

Input/Output Terminals and Overload Protection

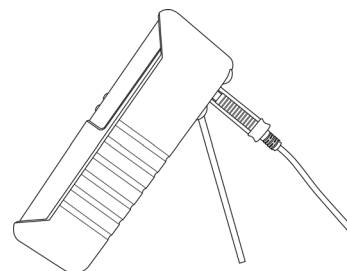
The output terminals are protected with DC 30 V overload protection. The overload protection limits of the input terminals are shown in the table below.

Functions	Overload protection
AC/DC voltage measurement	250 Vrms
Resistance measurement and continuity test	
Temperature measurement	
AC/DC current measurement	250 V/630 mA, fast-acting fuse



Tilt Stand

The instrument can be raised to a standing position by means of a tilt stand.



Safety Information

This instrument is safety and EMC certified in compliance with:

- IEC 61010-1:2001/EN61010-1:2001 (2nd Edition)
 - Canada: CAN/CSA-C22.2 No. 61010-1-04
 - USA: ANSI/UL 61010-1:2004
 - IEC61326-2-1:2005/EN61326-2-1:2006
 - Canada: ICES-001:2004
 - Australia/New Zealand: AS/NZS CISPR11:2004
- Measurement Category II 150 V, Pollution Degree 2.
Use with standard or compatible test probes.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Safety Notices

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

Safety Symbols

CAT II
150 V

Category II 150 V overvoltage protection



Double insulation



Earth ground



Caution, risk of danger



Caution, risk of electric shock

For further safety information details, refer to the *U1401A Handheld Multi-Function Calibrator/Meter User's and Service Guide*.

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